the Archives of the Royal Society. If this be regarded as a valid document and date of departure, I shall have something more to say about Prof. Bose's methods. If this date and document be not valid, his claim rests upon a paper at the Linnean Society of July 21, 1902, which seems to me to be a very interesting instance of scientific mimicry. Anyone interested in the study of such phenomena will find it instructive to compare the papers mentioned by Prof. Bose, of November 9, 1901, and July 21, 1902, to the Physiological and Linnean Societies respectively. I think he should also, as regards the general method, consult my Lectures on Animal Electricity of 1897 at the Royal Institution, which have been adopted by Prof. Bose as his point of departure.

A. D. WALLER.

British Association Meetings.

THE gradual decrease in the number of those attending the recent meetings of the British Association might suggest that the popularity or the usefulness of these scientific gatherings is on the wane. The opportunity for an instructive comparison exists in the fact that on the last three occasions on which the Association has met, it has repeated its visits to well-known centres, widely distributed. It might have been anticipated that, owing to the growth of material prosperity and of the population of these towns, a continually increasing number would have availed themselves of the advantages of these meetings. The following figures show, however, that the contrary is the case:—

Year.	Place of Meeting.	Number attending.	Year of previous Meeting.	Number attending.
1900	Bradford	1915	1873	1983
1901	Glasgow	1912	1876	2774
1902	Belfast	1620	1874	1951

Naturally the amount of grants for scientific purposes shows a similar decline:—

Bradford,	1072*l.*	against	1685*l.*	in 1873
Glasgow,	945*l.*	,,	1092*l.*	,, 1876
Belfast,	960*l.*	,,	1151*l.*	,, 1874

The usefulness of the Association in one direction is apparently lessened, since it has distributed about 1000*l.* less in the three years, but it may be that there is not the same necessity for assistance as was the case a quarter of a century ago, and that consequently the amount applied for by the different sections has not been as large as on previous occasions. But this does not put aside the fact that there is a distinct falling off in the interest exhibited, as tested by the numbers attending.

Supposing there is any decrease in the popular favour, and the smaller figures are not due to temporary causes, it seems worth while to ask whether any portion of the decline is traceable to reasons connected with the Association itself. This is a question which can be answered only by those who are intimately connected with the management, but there was a feeling among some of the members that the business was unduly protracted, and it was asked, with some apparent show of reason, why the meeting must always begin on a Wednesday. If the President's address, it was urged, was given on Monday evening, it would allow four clear, uninterrupted days for the business of the sections, which in most cases would be found sufficient, and then the Saturday could be employed in the manner it now is, or in winding up the unfinished sections. There may, of course, be an insurmountable objection to altering the arrangements which have existed for so many years, but which scarcely seem to meet the conditions of modern life, and it is with the view of hearing from some authoritative source the object of maintaining the old order of things that I have ventured to trouble you with this note.

W. E. P.

September 19.

Helmholtz on the Value of the Study of Philosophy.

THE opinions of Helmholtz, even as expressed in his *popular* scientific lectures, have such permanent weight that you may consider the following correction of sufficient general interest to publish it in your journal.

On p. 234 of Dr. Atkinson's "Popular Lectures on Scientific Subjects by H. von Helmholtz" (second series, new edition, Longmans, Green and Co., 1893), lines 7 to 11, we read:—

"And the physician, the statesman, the jurist, the clergyman, and the teacher, ought to be able to build upon a knowledge of *physical* processes if they wish to acquire a true scientific basis for their practical activity." (The italics are mine.)

What may have been Helmholtz's opinion of the value of a knowledge of *physical* science to the groups of specialists above named may be gathered from other parts of his writings, but in view of the surely unjust discredit into which the study of genuine philosophy (such as Helmholtz defines it) appears to have fallen in the eyes of the followers of the "Naturwissenschaften," it would appear just to quote the original passage, whereby it will be seen that what was perhaps a printer's error in the translation has altered the whole gist of the passage:—

"Und auf die Kenntniss der Gesetze der *psychischen* Vorgänge müsste der Arzt, der Staatsmann, der Jurist, der Geistliche und Lehrer bauen können, wenn sie eine wahrhaft wissenschaftliche Begründung ihrer praktischen Thätigkeit gewinnen wollten" (Helmholtz, "Vorträge und Reden," p. 189, fourth edition, second vol., Braunschweig, 1896). (The italics are mine.) That "psychischen" is *not* a printer's error for "physischen" in the original is evidenced by the context, which is so interesting that I venture to quote it. After a brief comparison of the relation of philosophy to metaphysics with that of astronomy to astrology, Helmholtz says:—

"Ebenso bleibt der Philosophie, wenn sie die Metaphysik aufgiebt, noch ein grosses und wichtiges Feld, die Kenntniss der Geistigen und seelischen Vorgänge und deren Gesetze. Wie der Anatom, wenn er an die Grenzen des mikroskopischen Sehvermögens kommt, sich Einsicht in die Wirkung seines optischen Instrumentes zu verschaffen suchen muss, so wird jeder wissenschaftliche Forscher auch das Hauptinstrument, mit dem er arbeitet, das menschliche Denken, nach seiner Leistungsfähigkeit genau studiren müssen. Zeugniss für die Schädlichkeit irrthümlicher Ansichten in dieser Beziehung ist unter Anderem das zweitausendjährige Herumtappen der medicinischen Schulen."

I have not access to earlier editions of the original German than 1896; relatively to my object, such reference seems unnecessary.

B. BRANFORD.

The Technical College, Sunderland, September 23.

Trade Statistics.

DR. MOLLWO PERKIN repeats in NATURE, p. 443, Mr. Levinstein's statement that in foreign trade "we went back during the ten years 1891–1900" (*Journ.* Soc. Chemical Industry, pp. 893–4). The evidence given is that "in the year 1890 our total exports amounted to 328 millions sterling," whereas "the average amount during the decade 1891–1900 was only 300 millions." But why should 1890 be taken as the standard year? It happens that the exports in that year were unusually high—higher, indeed, than in any other year from 1880 to 1898. Had Mr. Levinstein been in a hopeful frame of mind, he might have chosen 1888 or 1892 as his normal year, or, much more rationally, he might have taken the average of five years, 1886–1890 (299 millions), or the average of ten years, 1881–1890 (297 millions). Any of these methods would have brought out the more pleasing conclusion that our foreign trade is advancing. My object is not to decide whether it is or not, but to protest against Mr. Levinstein's method of proof. Can we imagine a meteorologist contrasting the average rainfall of a series of years with the rainfall of a *single* preceding year and on that basis announcing a change in the climate?

The facts (often exaggerated and misunderstood) as to the more rapid advance of German exports are fully and clearly stated in "Comparative Statistics of Population, Industry and Commerce," recently issued by the Board of Trade at the price of 5½*d.* It is not clear why Mr. Levinstein makes use of the British "total" exports, including all the transit trade, while for Germany he takes the "special" exports, from which the transit trade is, as far as possible, excluded. This swells all the British amounts by something like 25 per cent. beyond what they would stand at if they represented native produce only. It does not, however, much affect comparisons of rates of progress. But it confuses abstractors—in Dr. Perkin's abstract the distinction is overlooked.

F. EVERSHED.

Kenley, Surrey, September 9.

IT is quite true, as Mr. Evershed points out, that the exports for 1890 were unusually high, but those of 1899 and 1900 were also exceptional, owing largely to war exports; this, however, hardly alters Mr. Levinstein's contention—that the trade of the country shows a decline as compared to the trade of

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Germany and the United States. But if, instead of using Mr. Levinstein's figures, we take the annual exports per head of population, which is after all the truest test, we find that in the period 1870–74 they were 7*l.* 7*s.* 3*d.* per head, but in 1895–99 they had fallen to 5*l.* 19*s.* 5*d.* In Germany during the same periods they were 2*l.* 16*s.* 7*d.* and 3*l.* 7*s.* 2*d.* respectively, while in the United States they rose from 2*l.* 9*s.* 11*d.* to 2*l.* 18*s.* 4*d.* These figures show that although per head of population we export more than either of these nations, yet during the last forty years they have been increasing their exports per head, but those of the United Kingdom have been declining. The figures are much more striking if at the same time we examine the increase of population which has taken place in the three lands during the same period. From 1871 to 1901, the population of the United Kingdom increased by 31·7 per cent., while that of Germany increased 37·3 per cent. and that of America 96·1 per cent.[1]

I will now take another comparison—the five years' averages of the annual exports at the beginning and end of the period 1880–1900. Here it will be seen that the increase of exports of the United Kingdom only amounted to 6·4 per cent. (234 to 249 millions), but that Germany showed an increase of 23·1 per cent. (156 to 192 millions) and the United States 42·8 per cent. (166 to 237 millions).

Again, we are unable to show such large increases in the quantity of pig iron produced as are Germany and America. In the years 1870–74, the United Kingdom was far and away ahead of all other nations, producing 6·4 million tons against 1·8 million tons by Germany and 2·2 million tons by America. But in 1896–1900, the amounts were for the United Kingdom 8·9, Germany 7·4, and America 11·5 million tons.

Mr. Evershed objects to Mr. Levinstein taking a "fat year" as the starting point for his statistics, but, as I have already pointed out, the years 1899 and 1900, which come within Mr. Levinstein's decade, were also exceptionally good years and thus help to bring up the average. But I think that although Mr. Evershed has taken exception to the use of the year 1890, he will agree with all scientific and broad-minded men in being glad that a man of Mr. Levinstein's experience should have the courage to speak out and try to wake the nation up to a sense of its responsibilities. F. Mollwo Perkin.

Bipedal Locomotion of Lizards.

I kept for many years in a glass case some specimens of *Lacerta viridis*, and often observed them after a feed playing in the sunlight in a peculiar manner, first drinking water, which they lapped up with their wide forked tongues. The play was a sort of dance. The lizard stands on his hindlegs and, raising the fore part of his body, executes a rapid, playful waving of the forelegs. When both forelegs are used, they move in unison; sometimes, however, only one is employed. This action seemed to be meant as an attraction, the motions being performed facing another lizard, who often responded with answering waves of the forelegs; at times during the pastime, the pair would lick each other. I observed the females indulged oftenest in this coquettish dance, though the males would go through the same performance, strange to say, as often with each other as with a female for a partner to set to.

One female I kept for five years always, when excited, took a perpendicular position, progressing on her hindlegs with the fore part of the body lifted, and would play, running at my hand and biting, always in that erect pose.

The blue lizards of Capri, which I have kept for years in confinement, move along upright under excitement, also using bipedal action. Rose Haig Thomas.

September 23.

RUDOLPH LUDWIG KARL VIRCHOW.

> "All that lives must die,
> Passing through nature to eternity."

THE great master and founder of modern pathology, Rudolph Virchow, has passed away, full of years and full of honours, mourned, not only by his fellow countrymen, but by the whole scientific world. A fall early in January last resulting in a fractured thigh was the ultimate cause of his death, which occurred on September 5.

Born at Schilvelbein in Pomerania in 1821, Virchow attended the public school of his native town until his thirteenth year, when he entered the gymnasium of Cöslin and early distinguished himself by his linguistic attainments. In 1839, he entered the Friedrich-Wilhelm Institut, a training college for army medical officers, having among his teachers Müller and Caspar and among his fellow students Helmholtz, and in 1843 proceeded to take his degree. He had already shown such promise that he was released from service with the army and was attached to the Charité Hospital as prosector of anatomy, acting as assistant to Froriep, whom he succeeded in 1846. About this time he founded, in collaboration with Reinhardt, the famous *Archiv*, and after the death of the latter continued to edit it himself. In 1848, he carried out an investigation into an epidemic of relapsing fever in Silesia, and so uncompromising were his strictures on the authorities, together with his alliance to the ultra-Radical party, that he was compelled to resign his appointment at the Charité. Already, however, his reputation as a pathologist was made, and he was immediately offered and accepted the chair of pathology at Würzburg, where for the next seven years he devoted himself to pathological research. In 1856, on the death of Hemsbach, the Faculty of the University of Berlin petitioned for his recall, and, in spite of bitter opposition, was successful in its application, and Virchow returned to his old University for the remainder of his life, founding the Pathological Institute and the Museum of Morbid Anatomy.

Virchow's life was a strenuous one, and being blessed with a wonderful constitution he was able to devote himself to, and to become a master in, many pursuits, any one of which is usually sufficient to fill the life of ordinary mortals. In addition to his pathological chair, the duties of which he fulfilled up to the time of his accident, he was ethnologist and anthropologist, archæologist and Egyptologist, politician, a member of the Berlin Municipal Council for forty years, a member of the Prussian Chamber from 1862 to 1878, where he was the recognised leader of the Radical party and for fifteen years chairman of the Finance Committee. In 1880, he was elected a member of the Imperial Reichstag, but took little active part in its debates. One of his most important public works was concerned with the introduction of a system of drainage and with the installation of sewage farms, whereby Berlin has become one of the healthiest cities of Europe.

Of the man it may be said that he was beloved by his family and by his intimates. Short of stature and spare of figure, with grizzled hair and piercing grey eyes covered with spectacles, his was not a striking personality. Nor was he an orator, having a somewhat thin and weak voice and impassive delivery, but what he said was always to the point and clothed in simple but logical language, and he compelled a hearing by his very earnestness and simplicity. His political views and his uncompromising manner of stating them unquestionably prevented a full measure of State recognition of his genius.

As a teacher he attracted students from all parts of the world. Until his time, autopsies had been performed in a very perfunctory manner, the supposed seat of disease alone being examined. Virchow, however, submitted all the organs and tissues to a careful scrutiny, thereby in course of time as data accumulated proving the interdependence of one condition upon another and showing how widespread might be the effects of a limited lesion. At his demonstrations, the specimens were subjected to a rapid description and criticism, rough sections were cut and placed under the microscope, which was mounted upon a trolley running on rails, and so could be submitted without disturbance to the scrutiny of each member of the class. Drawings of the specimens

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[1] In Germany and America, the census returns are for 1900.

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